## Telemetry overview

Within Toolset you can configure a telemetry stream to allow a proper connection to the car.

### Configure device telemetry transmit (Tx)

For telemetry to be supported, you must enable it via the **Telemetry** node. Click **+** to add a new telemetry table. You can use the import and export tools to import and export existing telemetry tables between setups (2). Use the 'bin' tool to delete unwanted telemetry tables (3). When a telemetry table is added, channels are automatically generated to report the telemetry transmission status. Click the 'wrench' tool to configure these generated channels (4).



This allows you to configure the automatically generated transmission and reception status channels. Here you can modify the interval before EOL information is transmitted (this is useful if you know there is poor reception at the EOL, allowing you to postpone the transmission until you are in a better reception area.) The EOL repeat count and interval are fixed at 4s and 0.5s respectively.

# Configure PC telemetry receive (Rx)

You must define the source used, together with where the data is downloaded via **Settings > Telemetry**. Click **Add telemetry source** (1), rename the telemetry source (2) and select the telemetry source type from the dropdown menu (3).
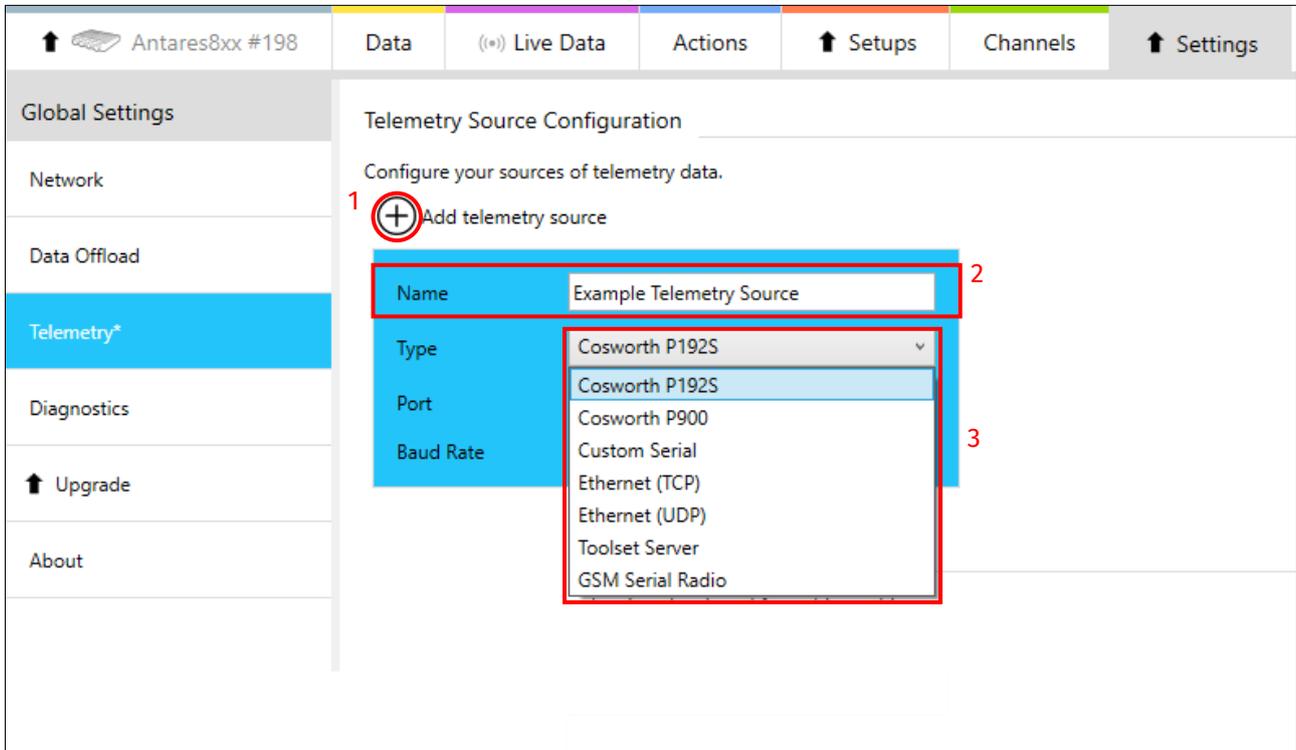


When a source type is added, you are prompted to configure the telemetry port settings. Some telemetry source type settings are predefined, such as the Cosworth P192. You can configure custom serial and Ethernet ports. Select the required port to connect to your pit stand receiver. Select a telemetry source, and then click the 'bin' icon to delete it.
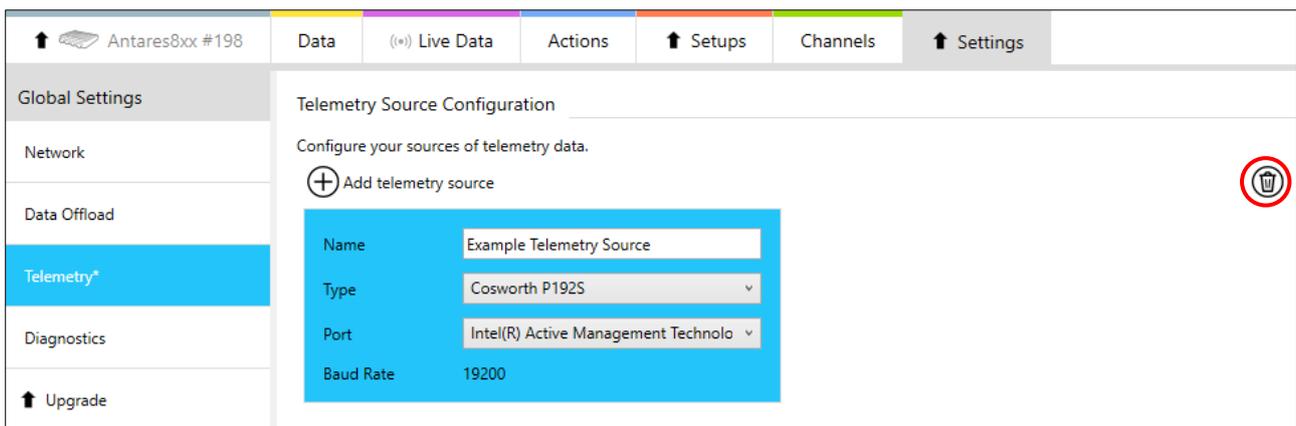
If you need to allow others to connect to your machine to view telemetry, select the **Share telemetry** option in the **Telemetry Sever Configuration** section. Keep the default values for both ports.



You can add several telemetry sources with a single machine as the server PC (see **Error! Reference source not found.**). You can choose to log the data that is received from the telemetry stream as well as the frequency at which it is updated.  Select the **Update logged data every…** option and enter a value between 20 and 900 seconds.



Once sources are configured you must save the configuration. Click **Save**. You can also select **Reset** to return to the default configuration.



## Configure logged telemetry data

To change the relative path of logged telemetry data, select the **Settings** tab and click **Data Offload**. Look in the **Offload Paths** section to find the **Relative Path**. At the beginning of the path add '<source>\'. This creates a specific folder for telemetry data and logged data.  For more information about saving logged data, see the Settings guide.



Once a telemetry table is added on the **Telemetry** node of the device setup, enter a name for the table (1) and select **Enabled** (2). Deselect this option to disable a table without deleting it.

**Note**: You must configure the channel rates for the channels within the telemetry table to allow them to be transmitted and received. Click **Edit Channel Rates** to navigate to the **Channel Rates** node (3). You can enter a description of the table (4). Multiple telemetry tables can be added to a setup.

You can then configure the type of telemetry from the **Output** dropdown menu. If a Cosworth serial telemetry system is selected, you only need to configure the serial port. If custom serial telemetry is selected, then additional information such as the transmission baud rate and data bits need to be configured. Cosworth devices also support ethernet (UDP) telemetry, which you can configure using the remote IP address and remote port.

The consumed bandwidth of the telemetry table based on the usage of the telemetry logging table is also displayed.



Once the setup is sent to the device, the telemetry key is written to the Toolset app data folder: C:Users\\**[YourAccount]**\AppData\Roaming\Cosworth\Toolset\[Toolset Version]"\TelemetryKeys.

## Configure telemetry channel logging rates

After you configure your PC telemetry Rx and Toolset telemetry Tx, you must assign rates to the channels transmitted over telemetry. This is done on the **Channel Rates** node.

The telemetry table is identified by its user-defined name and the 'radio' icon, rather than the device on-board logging 'tape' icon.



## Watch telemetry channels

To watch telemetry channels, select the **Live Data** tab, and then **Data**. Click **Sources** to check the telemetry connection and information.

**Note**: the 'radio icon' next to **Live Data** changes from grey to black when there is a working telemetry connection.
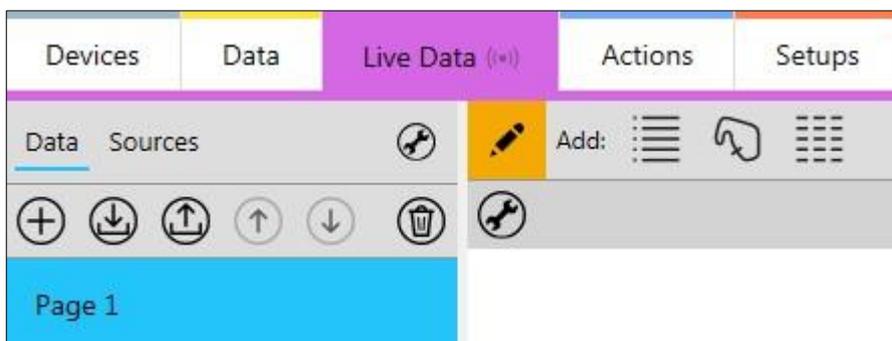


Click the **+** button to add and populate a page. Click on a page name to rename the page. Click the 'pencil' icon to display more buttons (from left to right):

- Add Channel List
- Add Map Control
- Add Tabular Outing Report.

Use the 'Add Channel List' option to add telemetry channels. When you add a page, click the 'wrench' icon to add required channels by selecting them from the **Available channels:** and moving them to the **Displayed channels:** section.
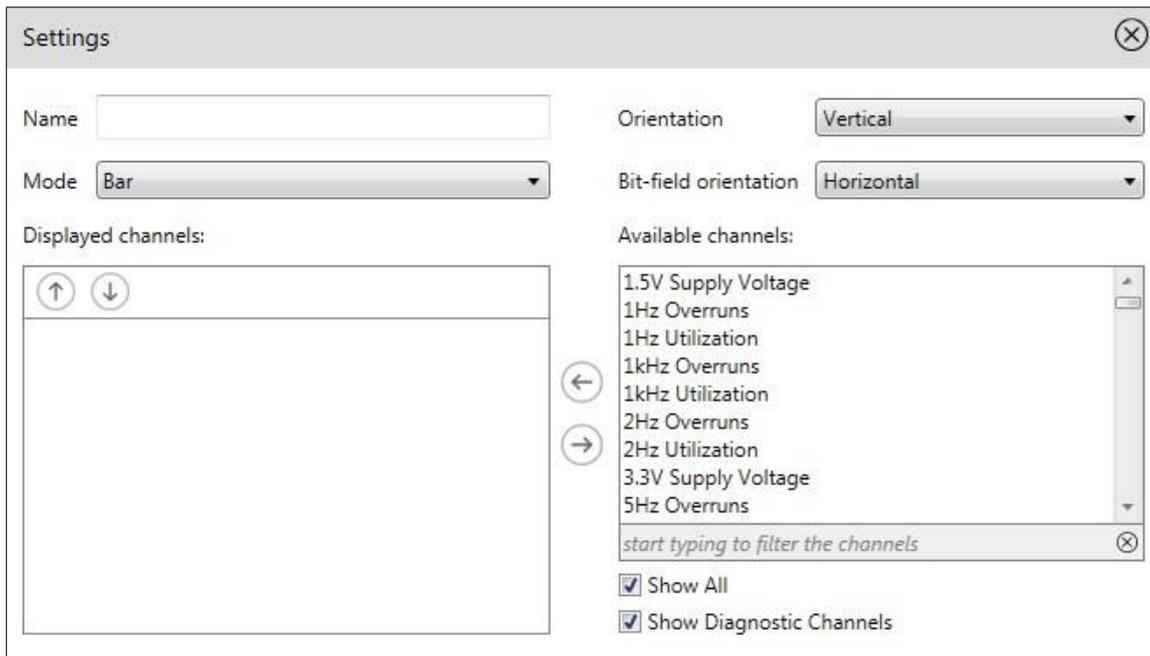
In the **Sources** section you can check the state of the telemetry link and view the target directory for the logged telemetry data.  In the **General** section you can view the name of the source, the device, and the setup.  In the **Connection** section you can see if your source is enabled and have the option to refresh the connection. In the **Status** section you can view status of the telemetry connection and information about the connection. In the **Telemetry Logging** section, you can view the status and destination of the logged data.
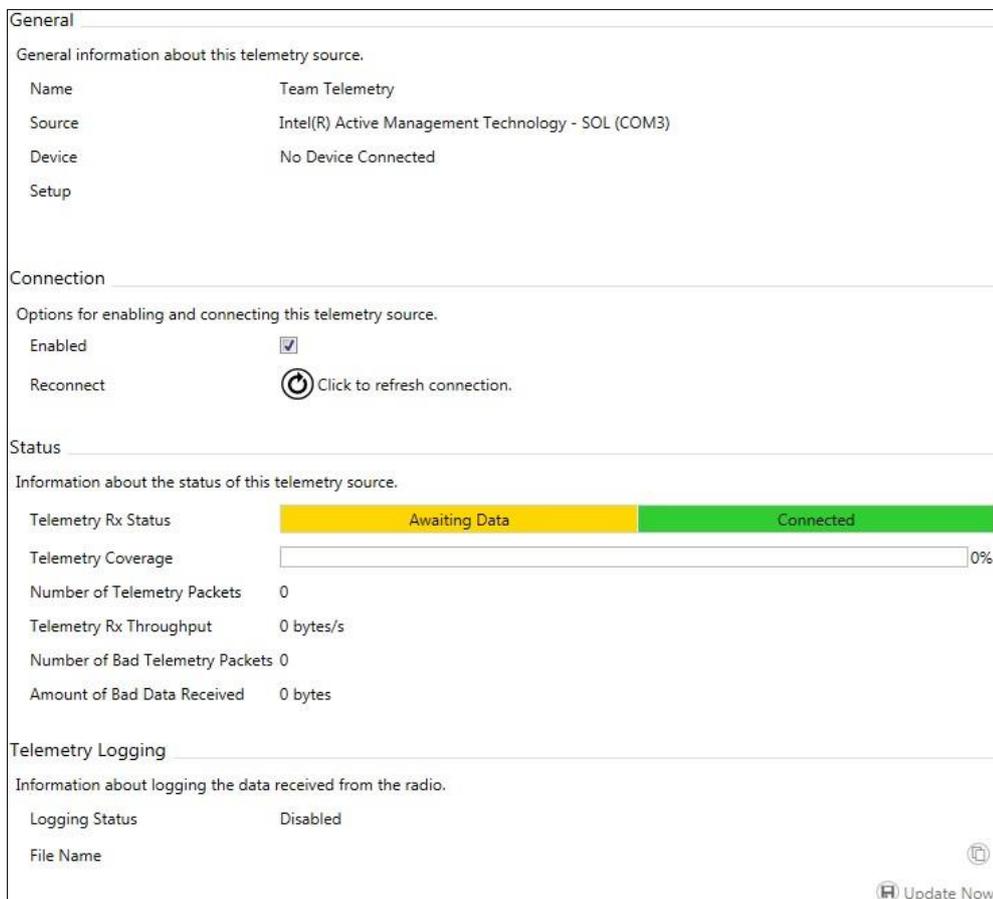
## Use Cosworth Live On Air (LOA) as a telemetry source

It is recommended that you use the pit stand as a common connection point for all connected users on Toolset. Point the pit stand to Cosworth to establish connection to the stream, configure it as a Toolset server connection, and then point the stream to each engineer connected and using telemetry. This allows connected users to receive telemetry through the desktop.

With the pit stand configured, the DAG points to Cosworth to establish the initial telemetry connection (if a telemetry key is available). The DAG then connects to the pit stand as a Toolset server. This distributes the telemetry key to the pit stand and provides it to connected engineers to avoid loss in telemetry if the DAG disconnects. Finally, each engineer can point their device to Cosworth directly to make sure that they also have a direct connection to the stream in case other devices disconnect or fail.

On the pit stand desktop, go to **Settings > Telemetry**. Click **Add telemetry source** and select 'Custom Ethernet' from the **Type** dropdown box. The **Location** is 'Cosworth's IP Address', and the **Port** is '74', followed by the 'Car Number'.

Next, add a new source for each engineer on the team who use telemetry. Each of these sources is a Toolset server connection. The **Location** for each engineer is their IP address, and the **Port** is '51413'.  This completes the desktop setup and the configuration is saved for future use.



The DAG also needs a custom ethernet connection to Cosworth. The **Location** is 'Cosworth's IP Address' and the **Port** is '74', followed by the 'Car Number'. The DAG also points a Toolset server connection to the pit stand desktop. The **Location** is the 'Desktop's IP Address' and the **Port** is '51413 (Default)'. This pushes the telemetry key to the desktop, and then to each engineer.

Each engineer only needs a 'Custom Ethernet' connection to Cosworth. The Location is 'Cosworth's IP Address' and the **Port** is '74', followed by the 'Car Number'. There is no need for a server connection because the pit stand pushes the key to each engineer.
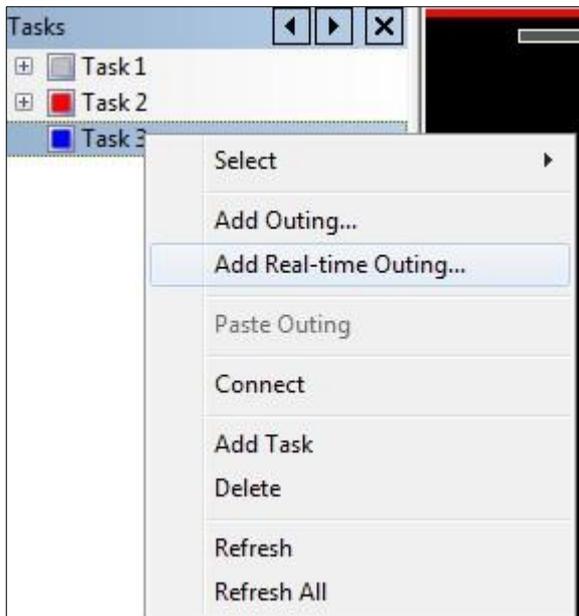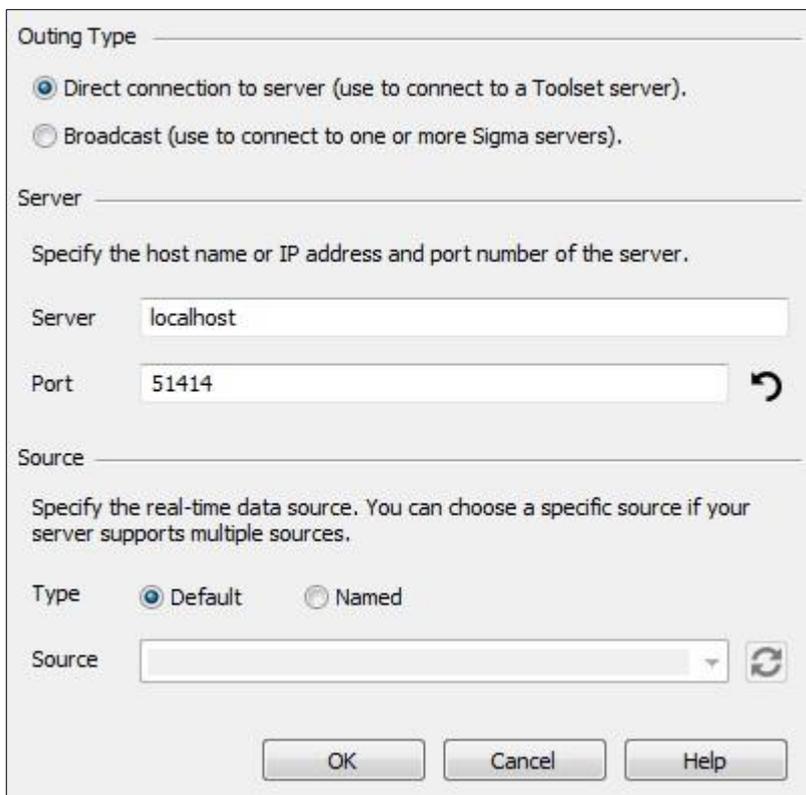
## Add a real-time outing to Toolbox

With an active telemetry connection open Toolbox and create a new task.
Right-click the task and select **Add Real-time Outing**.



If you have telemetry via Toolset, the default settings will work. The **Server** is your own machine (localhost) and the **Port** is 51414 (the default).



Once this is complete, a real-time outing is created and Toolbox telemetry established.